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Manifesto for Comprehensive Neo-Schumpeterian Economics

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Abstract

Within the last 25 years large progress has been made in Neo-Schumpeterian Economics, this branch of economic science which deals with dynamic processes causing qualitative transformation of economies basically driven by the introduction of novelties. By its very nature, technological innovation is the most exponent and visible form of novelty. However, Neo-Schumpeterian Economics should be concerned with all facets of open and uncertain developments. A Comprehensive Neo-Schumpeterian approach has to consider not only transformation processes going on on the industry level of an economy, but also those on the public and monetary realms. Our manifesto introduces these extensions and complements towards a Comprehensive Neo-Schumpeterian economic theory, and develops some guideposts in the sense of a roadmap for necessary strands of analysis in the future.

1. Introduction: Which Economic Approach Is Best Suited To Deal With Future?

Economic development and transformation processes, generally spoken change, have become much more noticeable in economic reality in the last 25 years than they have ever been before. That means that economic analysis is dominantly confronted with the difficulty to tackle the future. As often in the history of economics, this discipline seems to be taken by surprise and not well prepared to deal with this challenge: on the one hand major parts of economics are concerned with static allocation problems; on the other hand the dynamic subfields of economics have severe difficulties in grasping the structural and qualitative processes coming along with future orientation and its processes of transformation and development. In this manifesto we claim that only the Comprehensive Neo-Schumpeterian Economics approach (CNSE) is able to face the new challenges by integrating a future-oriented dimension which has necessarily to encompass all economic spheres, namely the industrial, the public and the financial domains.

Without doubt, economics is the science which focuses on economic welfare and the means to its increase. This can be stated as a goal for all schools in economics, among the most important being the Neoclassical and the Keynesian school as well as the Neo-Schumpeterian approach. But the angle of analysis differs sharply among these various approaches.

Boiling down the neoclassical approach to its essentials, it can be characterized by rational individuals acting on markets where the price mechanism is responsible for an efficient allocation of resources within a set of given constraints. Neo-Keynesian Economics, briefly characterized, turns out to be a demand-oriented macro approach, based primarily on short term processes occurring in non-perfect markets.

One of the decisive differences of Neo-Schumpeterian Economics with respect to those approaches in economics is the strong emphasis put on knowledge, innovation and entrepreneurship. Innovation is identified as the major force propelling economic dynamics. In this emphasis on innovation the Neo-Schumpeterian approach explicitly makes the future to its major concern. Generally, one may say that novelty, i.e. innovation, is the core principle underlying the Neo-Schumpeterian approach. Innovation competition takes the place of price competition as the coordination

mechanism of interest. Of course, prices are also significant, but concerning the driving forces of economic development they are not central. Whereas prices are basic concerning the adjustment to limiting conditions, innovations are responsible for overcoming previous limiting conditions and – as in economic reality, everything has an end - setting new ones.

Inseparably connected with innovation, true uncertainty in the sense of Frank Knight enters the scene with important consequences for analysis. Precisely defined probability distributions over a closed set of possibilities cannot be assumed any longer, instead the set of possibilities itself is subject to unexpected changes. By this intrinsic relationship between innovation and uncertainty, more complex modes of behaviour, which include 'potential surprises' become relevant (see e.g. Shackle, 1949).

The focus on novelties and uncertainty, i.e. the future, is thus the most important distinctive mark of Neo-Schumpeterian economics. By its very nature, innovation, and in particular technological innovation, is the most visible form of novelty. Therefore, it is not very surprising that Neo-Schumpeterian economics today is most appealing in studies of innovation and learning behaviour at the micro-level of an economy, in studies of innovation-driven industry dynamics at the meso-level, and in studies of innovation-determined growth and international competitiveness at the macro-level of the economy.

2. The Principles of Comprehensive Neo-Schumpeterian Economics

If we resume the basics and hallmarks of Neo-Schumpeterian Economics given in the introduction of this manifesto, one easily sees that this approach can contribute a lot to the understanding of the dynamic processes going on in a capitalistic economy.

However, at the present stage of development, Neo-Schumpeterian economics is still far from offering an integral theory of economic development. Most of the research of the last decades has primarily concentrated on the real sphere of an economy (Hanusch 1999, Hanusch and Pyka 2007). Technological innovations propelling industry dynamics and economic growth obviously are a major source of economic

development. But technological innovations are not the only source, nor can industry development take place in a vacuum. Instead, development is accompanied and influenced by the monetary realms of an economy as well as the public sector. The high degree of maturity which the Neo-Schumpeterian approach meanwhile has reached in the field of industrial dynamics, admittedly does not hold when it is aiming at the future-orientation of financial markets and the development of the public sector. Undoubtedly, the Neo-Schumpeterian Approach has to be set on a broader conceptual basis.

For this purpose we suggest Comprehensive Neo-Schumpeterian Economics (CNSE) as elaborated in Hanusch and Pyka (2006). CNSE has to offer a consistent theory which encompasses all realms relevant to an improved understanding of the economic processes of change and development, i.e. the future. Consequently, we argue that it is high time for Neo-Schumpeterian economics to devote considerable attention to the role of the financial and the public sector with respect to economic development. In particular, we introduce the CNSE approach as a theory composed of 3-pillars: one for the real side of an economy, one for the monetary side of an economy, and one for the public sector (figure 1).

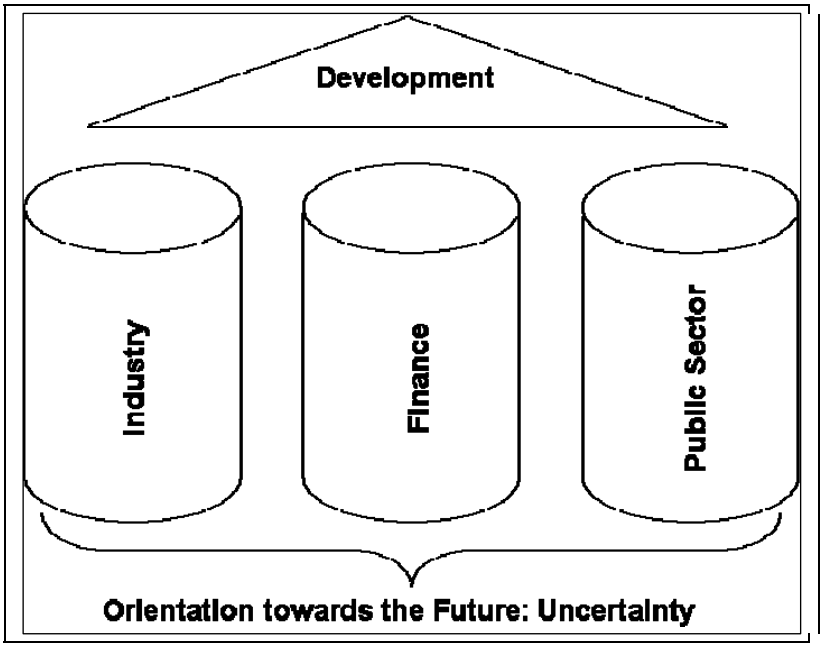

Figure 1: The 3-pillars of CNSE

In this light, the notion of innovation, i.e. the introduction of novelties, has to be seen as all encompassing, covering not only scientific and technological innovation, but including also all institutional, organizational, social and political dimensions. Furthermore, besides this result-orientation of innovation, a process-orientation has to be considered, both because innovations are taking place in time and because of the uncertainty intrinsic to economic development. This means that uncertainty caused by the future-orientation is relevant for each of the single pillars as well as the interrelated processes which take place between them. This is illustrated by the bracket *orientation towards the future* in figure 1 which encompasses all 3-pillars and introduces uncertainty to the analysis.

This fundamental importance of uncertainty thus has not only to be seen as a characteristic concerning the single pillars, but also as a phenomenon shaping the relationships between the 3-pillars causing a high degree of complexity. To deal with this complexity, we suggest to introduce the following separation in the analysis of the existing connections:

(i) Between each of the 3-pillars many points of contacts exist, which in the light of CNSE have to be considered not only as interfaces but as intersections which illustrate a deeply interwoven mutual dependency. These intersections will be treated in section 4 of this manifesto.

(ii) Additionally, the relationships between the 3-pillars drive or hinder the development of the whole socio-economic system in a non-deterministic and *co-evolutionary* way. By this, qualitative changes, so importantly shaping economic development, emerge, allowing for a prolific exploitation of new potentials. In this case economies may stay within a so-called Neo-Schumpeterian corridor of prosperous development. In the other case, the economies will find themselves outside this corridor, either in regions of stagnation or in regions of dangerous hyper developments, both threatening their future potentials. The Neo-Schumpeterian corridor is introduced in section 5 of our manifesto.

But, before dealing with the pillars' intersections and their co-evolutionary relationship, we describe in more detail the future-orientation of the single 3-pillars as the central elements of CNSE.

3. The 3-Pillars as Central Elements of CNSE

We begin with the first pillar namely industry development and the current and future challenges in this area of research. Then, we proceed to the financial markets and the public sector, the second and third pillar of a comprehensive approach.

3.1 The Industrial Pillar

The raison-d'être of CNSE is the prevailing transformations of economies, which persist at the macro-, the meso- and the micro-levels. However, although the transformations are very visible at the macro level, they cannot be analysed or understood on this level (e.g. Carlsson and Eliasson 2003). The sources of these qualitative changes instead can be found in the industry dynamics at the meso-level (e.g. Saviotti and Pyka 2004). Yet, the dynamic potential of industries is propelled by the creation of novelties and entrepreneurial decisions at the micro-level of the economy.

Consider, for example, the transformation of economies with respect to employment shares towards service industries which has led to the so-called *Fourastier Hypothesis*. This by no way can be explained by referring to the proportional growth of existing industries. Instead new industries emerge again and again throughout the history of capitalism, driving out existing ones or at least changing considerably their relative weights. The emergence of the new industries is driven by innovation and tested by entrepreneurial action.

Perhaps the most severe transformation in structure and organization the industrialized world has undergone is the current one, caused by the increased importance of knowledge, in particular scientific knowledge relevant for production activities combined with an increasing internationalization of business. For many years now, knowledge intensification and globalization have been widely considered to be the most important challenges with which industrialized and industrializing economies are confronted (e.g. Pyka and Hanusch 2006). In addition, severe qualitative changes in the sectoral composition, in the relevant competences and in

the institutional settings lead to catching up and leapfrogging processes which affect the international competitiveness of nations and regions, and confronts established companies with major technological and organizational transformation processes.

These changes can immediately be traced back to developments going on at the meso- or industry level. The underlying industrial dynamics are characterized by a crucial transformation of the nature of competition. Especially in technological intensive sectors, such as biotechnology-based industries and information and communication technologies, due to the high degree of complexity of the underlying knowledge base, competition no longer takes place between single companies only, but often occurs between networks of actors, where new knowledge is created and diffused collectively. Most importantly, firms often no longer compete in a price dimension only, as competition in innovation has taken the dominant role.

Accordingly, competition and cooperation are simultaneously guiding the decisions of economic actors. Whereas traditional manufacturing firms are forced by the ongoing globalization to become ever larger, either through own growth or by mergers and acquisitions on an international basis, and are acting in an environment of strong price competition, they are at the same time intensively engaged in a competition for innovation. To cope with the pressure stemming from complex modern innovation processes they are obliged to search for possibilities of collaboration with small and new entrepreneurial and technological intensive start-up companies. In knowledge-intensive industries we often observe the co-existence of small entrepreneurial firms, shaping technological development and contributing strongly to technological progress, and large established companies performing their business in routinized ways (see Pyka and Saviotti, 2005).

By emphasizing the decisive role of entrepreneurial business formation and the emergence of new industries, we are already hinting on the processes at the micro-level of the economy underlying all these development processes. Innovations, affecting potentially the composition of sectors, are born at the micro-level. New ideas paired with well developed absorptive capacities of entrepreneurs, who are well connected to their own financial and scientific/technological networks, eventually lead to a wide and fast diffusion of novelty and thus to new industries (e.g. Grebel, Pyka and Hanusch 2003). As a prerequisite for a prolific creation of a new industry, of

course, consumers also have to be aware of the new commodities and services offered.

Knowledge generation and diffusion processes stand behind innovation. Thus, an examination of knowledge in general and knowledge dynamics in particular is absolutely necessary in Neo-Schumpeterian economics. The simplified treatment of knowledge as a public good, such as it is a concern in neoclassical economics, is intellectually no longer profitable. Instead, the tacit, local, and complex character of knowledge is emphasized.

By focusing on the generation and dissemination of new knowledge, from the point of view of knowledge dynamics, severe non-linearities enter the Neo-Schumpeterian economic system, decisively affecting the dynamics of the sectoral development as well as the sectoral composition of an economy. As a consequence, Neo-Schumpeterian Economics has rid itself of the concept of a representative agent. Heterogeneous agents with varying competences and capabilities, industries at very different stages of maturity, and institutional frameworks differing between sectors, regions and nations co-exist, enriching strongly the complexity of the economic systems under analysis. The changes going on at the macro-level of the economy then are not only the aggregates of the changes at the micro- and the meso-level, but instead several emergent properties and non-linearities have to be considered, such as unbalanced growth processes, catching-up - , leapfrogging - as well as forging-ahead – dynamics, which become part of the economic reality.

3.2 The Financial Pillar

Let us now turn to the second pillar of a comprehensive approach to Neo-Schumpeterian Economics, the role of finance.

Schumpeter himself gives a first hint of the important role of the financial sector for economic development in his *Theory of Economic Development* of 1912. Besides the creative entrepreneur, the risk taking banker is the second most important force behind economic dynamics. Obviously, in modern terms better notions for Schumpeter's banker are industrial banks and private equity firms, as these agents

are engaged in investment activities whereas the major interest of banks has shifted towards the repayment of their loans. Indeed, the entrepreneur and the banker have to be considered as in a symbiotic relationship: the entrepreneur opens up the possibilities of investment for the banker, and the banker enables venturing possibilities for the entrepreneur.

In this respect, J. P. Morgan (1837–1913) - as a banker who also took active roles in real ventures such as the American Railways - can be considered as an example par excellence of a Schumpeterian Banker. Generally, one can claim, that the major task for the financial sector as a whole has to be seen in the acquisition and supply of capital over time needed by firm actors for their entrepreneurial activities.

Keeping in mind the research objective of Neo-Schumpeterian economics, it is difficult to distinguish between the evolution of the financial sector and its role and function in particular stages of development in capitalistic economies. For this reason, we only try to give a brief overview of the most important developments, without claim of being comprehensive.

The banker and the bank system turn out to be not sufficient in describing the prolific development of capitalistic economies. Besides banks, stock markets entered the scene and played an outstanding role for firms in their endeavours to acquire capital. The amount of capital needed to finance ventures in the new industrializing world since the end of the 18th century accelerated the diffusion of stock markets tremendously.

The mixture of bank and stock market financing only recently was extended by the emergence of private equity and venture capital firms. Basically, due to the increased techno-economic opportunities within knowledge-based economies going hand in hand with strongly felt uncertainties of scientific and technological innovation, venture capitalists appeared as a blend of financial and technological knowledge focusing on acquiring capital for risky innovative start-up companies.

These developments obviously fulfil the requirements of Neo-Schumpeterian economics as the financial sector’s development follows the increasing and differentiating needs of the real sector and at the same time enables the development of the real sector. From a Neo-Schumpeterian perspective, the future orientation of the finance sector is essential and can be traced back, on the one

hand, of course, to the uncertainty of innovation processes. On the other hand, however, a major feature of knowledge creation and innovation is the extreme time consuming nature of these processes. Both characteristics make a long-term orientation in the real as well as in the financial sector absolutely necessary.

Of course, the future orientation of Neo-Schumpeterian economics also makes it necessary to rethink the role of monetary policy and central banks. In Monetarism and Neoclassical Economics, this role is clearly defined: It is the stability of consumer prices or low inflation rates which more or less defines the only benchmark for the policy of central banks. The main instruments to fight inflationary tendencies can then be seen in regulating the supply of money and liquidity and in fixing short-term interest rates. These instruments still remain important when we turn to the Neo-Schumpeterian context. What changes, however, is the main goal of monetary policy. Besides, or even instead of fighting consumer price inflation, the political support of growth and development in an economy or in a global economic area, for instance the European Union, takes center stage in strategic thinking, with severe consequences concerning the economic and the political role of central banks, for instance the European Central Bank.

On the one hand, this means that the supply of money and liquidity should be intended above all to foster Neo-Schumpeterian innovation dynamics, being the main source and the basis of modern growth and development. On the other hand, central banks continuously have to consider carefully the symbiotic relationship between the real and the financial spheres of an economy, as mentioned above. Because a policy of cheap liquidity, for instance, aimed initially at inducing and accelerating economic growth, may easily turn a regular Neo-Schumpeterian development into a hyper-dynamic one, with the tendency to build up explosive bubbles on the financial, and (today, even more importantly) on the asset and energy markets. This might especially be the case when huge speculative orientated hedge funds enter the markets and try to maximize short-term profits.

In this case central banks, from a Neo-Schumpeterian perspective, have the task of observing and controlling such inflationary tendencies. For modern economies, these tendencies may be increasingly important, compared to the ordinary consumer price inflation considered exclusively in the past. This argument is even stronger if one

considers that Neo-Schumpeterian dynamics, based on innovation, sooner or later will be accompanied by remarkable productivity gains and quality improvements, which very likely restrict consumer price inflation to a moderate rate.

3.3 The Public Pillar

Let us finally turn to the third pillar of CNSE, the public sector:

Our considerations of a Neo-Schumpeterian theory of the public sector focus on the justification of the state and encompass a normative perspective in the sense of defining tasks for public activities as well as a positive-empirical perspective supposed to explain real developments.

The existence and necessity of a public sector can be explained within the Neo-Schumpeterian approach again by the persistence and inevitability of uncertainty accompanying every kind of innovation. Schumpeter's notion of *creative destruction* in his 1942 book *Capitalism, Socialism and Democracy* hints at the two sides of the innovation coin: in every innovation process, we find winners and losers. Ex-ante it is impossible to know who will win and who will lose the innovation game. Accordingly, the uncertainty of innovation processes throws a *veil of ignorance* over the economic actors. In this sense, the ideas of John Rawls *Theory of Justice* (1971) can be transferred to the Neo-Schumpeterian context. An individual as a member of society can agree on a *social contract* to deal with the peculiarities and imponderables of innovation processes. This social contract then has to be executed by a state authority. In the Neo-Schumpeterian context, sure enough the social contract also applies to firm actors and entails both support for uncertain innovation activities as well as social responsibilities in the case of innovative success (e.g. Acs 2006).

The normative perspective of an economic theory of the state is supposed to guide the deviation and design of all public activities - encompassing public expenditures as well as public revenues - which in a Neo-Schumpeterian context has to include the developmental potential of the economy. In this sense, basically all public interventions have to be scrutinized, as to whether they support or hinder the

potential of economic development. Accordingly, for public activities, an orientation towards the future is postulated.

Two types of failure generally endanger this goal and can be considered the cardinal errors of economies: the first deals with the danger of discarding promising opportunities too early, whereas the second deals with the possibility of staying for too long on exhausted trajectories (Eliasson 2000). In both cases, resources for future development are wasted, which demands for policy intervention.

But why do economies and economic actors tend to these failures? The sources of potential failures are manifold, but again stem from the uncertainty underlying economic processes as well as the complex nature of novelties:

A first example is given by consumers' decisions concerning so-called *merit goods* as introduced by Richard Musgrave (1958) in public finance. Due to the future orientation and the complex character as well as the high probability of positive spillover effects of merit goods, individuals tend to undervalue strongly their consumption as, e.g. in education, or to underinvest in respective activities, as, e.g. with respect to R&D. A future-oriented policy, therefore, has to consider these shortfalls, e.g. by improving the knowledge of economic actors concerning the benefits of the respective goods and activities and/or by supporting their consumption, use and production.

A second example deals with different and unbalanced speeds of development, which is symptomatic of dynamic innovation-driven processes. Creative destruction in a Schumpeterian sense is most often closely connected to the obsolescence of labour qualifications which might cause severe problems of mismatch unemployment on the labour markets – the new qualifications are not sufficiently available, whereas obsolete qualifications abound. From the perspective of Neo-Schumpeterian economics this mismatch on labour markets demands not only an administrative design of labour policy, but also an active future-oriented or knowledge-based design. With respect to recent labour market policy designs, the Danish model implemented since the 1990s is a good example of such a future-oriented approach.

With respect to a positive-empirical approach of a Neo-Schumpeterian theory of the state, which seeks to explain real developments, a promising starting point again comes from public finance and an empirical observation discussed more than 100

years under the heading of *Wagner's Law* (Wagner 1892). Adolph Wagner (1835-1917) formulated this *law* following empirical observations that the development of an industrialized economy is accompanied by an increasing absolute and relative share of public expenditures in GNP. According to Wagner, the reasons for the income elasticity above unity towards public goods are to be seen in the increasing importance of *law and power* issues as well as *culture and welfare* issues in industrializing and developing economies. This way, public dynamics are narrowly connected to Neo-Schumpeterian dynamics, which demand higher qualities of public goods such as infrastructure, education, basic research etc. as a condition sine-qua-non for economic development.

To avoid either an unbounded growth of public activities, which Schumpeter (1950) himself labelled *the march into socialism*, or an increasing privatization of public goods e.g. in the health and education sector - which goes hand in hand with an increasing uneven distribution of services - itself an obstacle for economic development - a policy recommendation of Neo-Schumpeterian economics has to focus on adding a qualitative dimension to Wagner's quantitative dimension. This can be achieved only by taking seriously the normative requirement in the design of all public activities of the Neo-Schumpeterian approach, namely their orientation towards future development. In the case of potential insane Wagnerian dynamics leading to an overall expansion of the public sector, a Neo-Schumpeterian policy design will have to encompass a strengthening of the absorptive capacities of consumers towards superior merit goods.

The last example already illustrates the important co-existent relationship between the different pillars of CNSE which in the following sections will be discussed more deeply.

4. Interfaces and Intersections between the 3-Pillars

Without doubt between the 3-pillars many points of contact exist, which co-determine the dynamics going on in a particular pillar under consideration. Conceptually this is by far not new to economics and usually leads to a set of assumptions which are considered to frame economic processes and decision making. However, we claim

that in order to investigate the important relationship- dimensions between the 3-pillars, it is by far not sufficient to identify only the interfaces between the pillars in order to derive a set of subsequent constant assumptions. In addition to *interfaces* we apply the notion of *intersections* between the pillars in order to stress their mutual interdependencies and co-evolutionary potentials.

These intersections comprise all pillars including (i) the industrial-public pillar intersection, (ii) the public-financial pillar intersection as well as (iii) the financial-industrial pillar intersection.

(i) The industrial-public pillar intersection has an important manifestation in the design of modern innovation organization which in the literature is labelled as collective innovation processes (e.g. Pyka 1999). Private firms and public research institutes collaborate in knowledge creation and diffusion which includes besides inter-institutional collaborations between firms and public research institutes, the engagement of private firms in basic research e.g. among others in areas as molecular biology and nanotechnologies, as well as pro-active technology transfer in public-private research partnerships.

Or consider the international and interregional competition for industrial settlement, its impact on future development of nations and regions, and the role the design of tax systems plays in this competition. A future oriented Neo-Schumpeterian policy has to scrutinize whether the conditions generated by public activities allow for, or even open up, developmental potentials for the industrial sectors in the future.

(ii) The public-financial pillar intersection comprises policy activities to attract financial actors i.e. their international location decisions, and to provide for knowledge and information in high uncertain areas of innovation and industry development in order to support the decision making processes of financial actors. It also includes the cooperation of financial actors when it comes to the implementation and application of policy programmes to further innovation and entrepreneurship. In particular a long-term commitment based on sound technological forecasts is postulated to be an essential ingredient of a future orientation of the financial pillar, which, however, demands for joint efforts of and fine-tuned coordination between the two pillars.

(iii) Closely related, the financial-industrial pillar intersection on the one hand embraces the supply with uncertainty capital on the financial side, as well as, on the other hand, the provision of future promising investment possibilities like the emergence of new industries on the industrial side. It is the industry and service sector of an economy which has to provide the potentials for innovative growth and development in an economy and it is the financial sector which has to provide for the financial resources to spur these processes. In this sense there exists a kind of symbiotic relationship between these two pillars, as we already have pointed out in our discussion of the financial pillar.

The above examples can show how many different interrelationships and intersections exist between each of the pillars and how relevant they are for a future oriented concept of economic development. A last brief example, however, may illustrate the importance of this connectiveness for the policy design of social systems aiming at and using the concept of pillar intersection in a general way by including all 3-pillars into consideration.

Consider, for example, the increasing life expectancies and demographic changes which are key issues in almost all industrialized countries and which demand new models and programs aiming at a future-oriented design of social systems and programmes. These programmes have to include both educational dimensions covering the early periods of life as well as the retirement system aiming at social security in the old age. A future-oriented policy design following the idea of pillar intersection first of all should look at and consider the possibilities of each pillar to reach the desired goal. Naturally, this includes the deliberation of negative as well as positive feedbacks between the respective pillars which might further and hinder the achievement of the desired policy objectives.

One important step for many European countries to improve the future-orientation of their social security systems, for instance, facing severe difficulties stemming from demographic changes would be the switch from a public pay-as-you-go-system to a retirement system based on private capital markets and on the funding principle. By this step large amounts of capital will be collected in pension funds which have to be re-invested in future-oriented activities in order to create the desired returns needed

to finance the pension payments. This will both generate the necessity to invest in the most dynamic and innovative industries as well as to provide the uncertainty capital to do so, i.e. supporting entrepreneurial activities leading to the emergence of new industries.

In this case and in a world which is characterized by knowledge-based societies and global financial markets a country or an economic region like the EU will hardly have a chance to escape from an international competition of future-oriented system transformation and policy reform. The reasons for that may be manifold, but primarily it is the general interrelatedness of the 3-pillars which shows up even on a transnational level. If highly developed countries want to secure their competitiveness in a modern globalized world they have, at first, to rely on and to expand and develop the economic potentials of their future oriented industries. These industries, however, need huge financial means as well as the corporate pressure of return oriented investors to generate new and to use the existing possibilities for profit making in an innovative manner. Firms which cannot accept this close connexion between the financial and the real business sphere sooner or later will get into trouble. They will be confronted not only with the diminishing expectations of the actors in the world of international finance, but also and most severely will have to cope with a lack of funding of their specific activities. The flexibility and the mobility of international financial investors doing their business in global markets will give a country with a future-oriented national security system, strongly fixed on high returns of the collected savings for future pensions, sooner or later the chance and the opportunity to build-up its own social security system so successfully that it will dominate those of other countries not in line with that specific system.

In addition, this situation will give the progressive, future-oriented country a great chance to transfer the financing of its own system to other countries which are not willing to give up their pay-as-you-go-system, based on the solidarity principle of generations. This means that countries, for instance those in the EU, which are not prepared to change from the presence-oriented solidarity principle to the future-oriented funding or rentability principle in the end will find themselves in a situation, where they not only will have to finance their own social systems via taxes or contributions, but also will be pressed to partly secure the system of a foreign country, like the USA. Responsible for this pillar-interrelatedness even on a global or

international level are primarily the high returns being earned in future-oriented companies or industries in Europe, for instance, and being paid by the financial markets to foreign US-pension funds or other global investors like hedgefunds or private equity firms acting for or in the name of such pension funds.

5. Economic Co-evolution: The Concept of a Neo-Schumpeterian Corridor

As we already saw, CNSE focusing on innovation driven, future-oriented development has to offer theoretical concepts to analyze the various issues of all 3-pillars: industry, financial markets, and the public sector and their encompassing qualitative interrelations. Innovation and, as a consequence thereof, uncertainty are ubiquitous phenomena characteristic of each of these pillars and also of their intrinsically interwoven connectiveness. An improved understanding of the development processes going on in modern capitalistic economies can only be expected when these *co-evolutionary dimensions* of the 3-pillars are taken into account. This is illustrated with the concept of a Neo-Schumpeterian Corridor shown in figure 2.

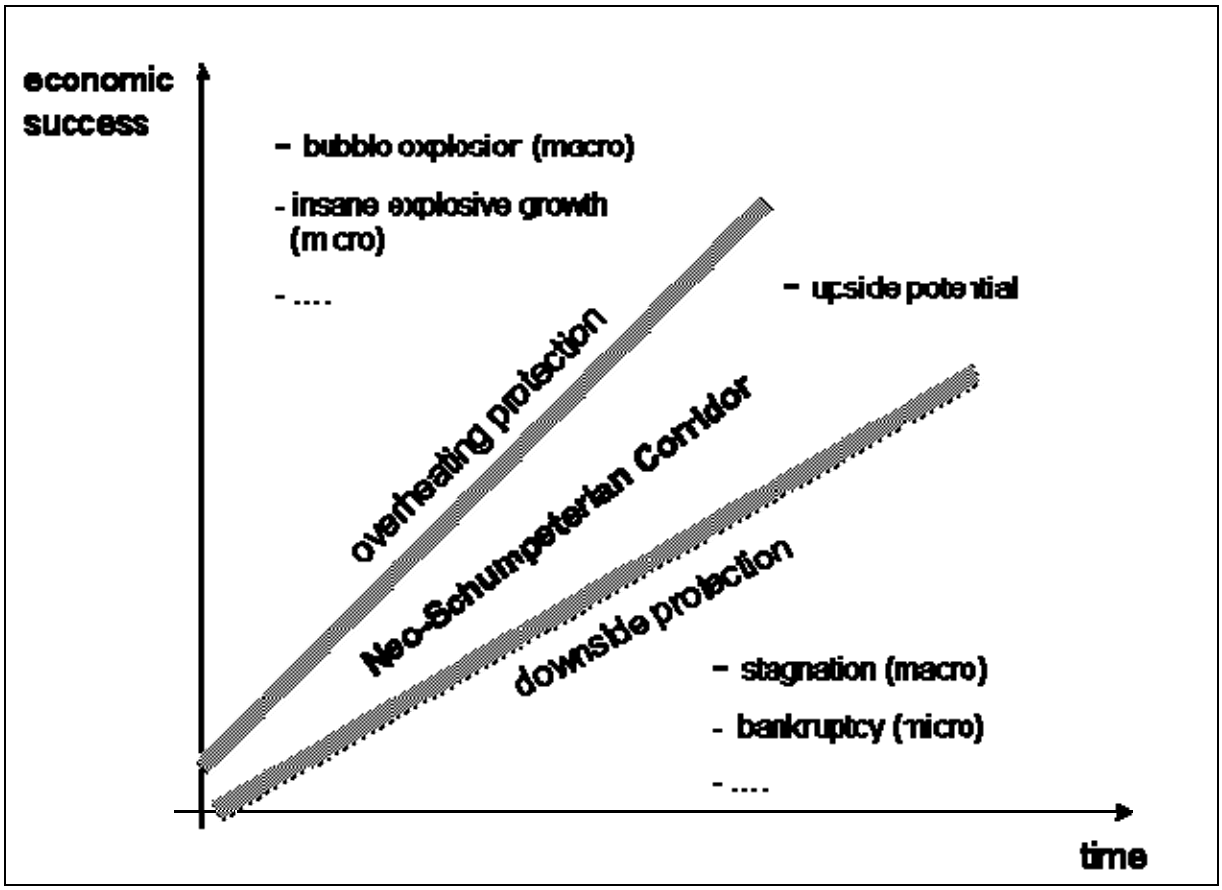

Figure 2: The Neo-Schumpeterian Corridor

In a CNSE perspective, there exists only a narrow corridor for a prolific development of socio-economic systems. Profound and Comprehensive Neo-Schumpeterian development takes place in a narrow corridor between the extremes of uncontrolled economic success (growth) and exploding bubbles, on the one hand, and stationarity, i.e. economic stagnancy, on the other hand. Consider for example the case of the financial sector, exaggerating the developments taking place in the real sector and leading to dangerous bubble effects, which might cause a breakdown of the whole economy. Or think of the case in which the public sector cannot cope with the overall economic development, and infrastructure, education, social security etc. become the bottlenecks of system development.

Economic policy in the sense of CNSE is supposed to keep the system in an *upside potential* including both *overheating-protection*, i.e. on the macro-level bubble explosions and on the micro-level insane explosive growth, and *downside-protection*, i.e. on the macro-level stagnation and on the micro-level bankruptcy.

A brief view on the economic history of different economies in the second half of the last century may illustrate that the two threats - bubble explosion and stagnation - shape the quantitative and qualitative processes of economic co-evolution. It emphasizes also the necessity to develop further CNSE in order to get a grip on the importance of these co-evolutionary processes.

In the post Second World War period, both Japan and Germany recovered extremely well in economic terms, whereas the United States increasingly lost ground. However, both countries fell from the Neo-Schumpeterian corridor - in opposite directions – whereas the United States returned to the corridor. What happened?

In both countries, Japan and Germany, specific institutional arrangements and organizational forms evolved after World War II which were not simple copies of the previous successful US-system, but instead proved to be relatively superior. In particular, one may stress the important meaning of the financial sectors designed for economic recovery and the overtaking of the Japanese and the German industrial sectors. In both cases, long-term relationships between industry and banks opposed the short-term character of these relationships within the US financial sector. This long-term commitment was extremely beneficial for the economic development of large industries in this period of comparatively stable technological environments. In the same vein, labour markets and their institutions were oriented towards long-term relationships compared with hire-and-fire policies in the US which furthered well productivity improvements.

But during the late 1970s and early 1980s, the German system could not cope with the new challenges coming from the information and communication technology revolution, as the starting event of the so-called knowledge-based economies. Its institutions and organizational designs now proved to be too sedate, and its economy drifted upwards in the stagnation sector of figure 2.

By the end of the 1980s and early 1990s, also the Japanese economy broke down and moved into a development period, today referred to as the decade of near-zero-growth. The major reason was a overheating of the financial sector which led to speculative bubbles, which, after their bursting, affected the whole economy.

The American model, by contrast, was now regarded as the epitome of dynamism and entrepreneurship, and was seen as a guidepost for the 21st century. The US

economy thus entered the Neo-Schumpeterian corridor in the *new-growth* period again. Since the early 1990s, a high rate of creation of technology-intensive firms combined with a substantive raise in privately financed R&D, led to the emergence of world leading technology clusters such as the famous Silicon Valley and Route 121. Thus, economic development of the 1990s was characterized by high average growth rates, low unemployment and low inflation.

The historical examples illustrate the powerful economic dynamics shaping overall economic development. The historical examples illustrate further the explanatory power of the Neo-Schumpeterian Corridor, which allows an analysis of the underlying mechanisms. In this sense, we emphasize the important need to develop further the CNSE approach in the directions outlined in this manifesto.

6. Conclusions: Comprehensive Neo-Schumpeterian Economics versus System-theoretic Approaches

CNSE has an important source of inspiration in the mainly descriptive approaches of *systems theory*. Here, learning and the building up of competences are considered to take place in an interactive and collective ensemble of subsystems. Besides economic actors - basically firms - institutional actors such as universities and other public research laboratories as well as the institutional frameworks and governance structures shape the innovation process taking place in national (e.g. Nelson 1993 and Lundvall 1988), sectoral (e.g. Malerba 2002 and 2005), regional (e.g. Cooke 2002) as well as corporate innovation systems (e.g. Cantwell, Dunning and Janne 2004) and is important in determining their performance.

CNSE share with these system-theoretic approaches the major concern, namely an explicit consideration of the mutual interdependencies of various actors and economic domains driving innovation processes as well as the interactions between them.

However, CNSE offers certain advantages in relation to system-theoretic approaches and goes beyond their possibilities. In particular, the agent-based foundation of CNSE (see e.g. Pyka and Fagiolo 2007) allows the integration and analysis of

decision making in the process of development. It includes explicitly the main actors in a modern capitalistic economy, namely industry, the financial markets, and the public sector. And, it is able to consider theoretically as well as empirically the future-orientated goals and instruments of these actors as well as their particular constraints and trade-offs.

Elsewhere (Hanusch and Pyka, 2006) we have shown that CNSE is drawing on complexity economics, evolutionary economics, industry dynamics and public finance as well as on a process-oriented understanding of innovation and therefore has a profound and adequate theoretical foundation and an appropriate framework for the analysis of dynamic co-evolutionary processes. Compared to the snapshot description of innovation systems in the system-theoretical literature this offers a decisive advantage in theoretical as well as in policy analysis.

In this sense we consider CNSE as the broader analytical approach which on a sound theoretical base allows for quantitative as well as qualitative empirical studies of innovation processes; and their consequences for economic development; keeping in mind that these innovation processes may be traced back to and have an impact on the co-evolutionary relationship of the 3-pillars of modern capitalistic economies.

In this light, this manifesto has to be seen as a first step to consider CNSE as a theoretical and empirical framework for economic analysis as well as economic policy in a world which more than ever before is in need for a serious future-orientation to be considered in all domains of life.

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